REMARKS

Prior to this Reply, Claims 1-18 and 20-101 were pending. Through this Reply, Claim 20 has been cancelled, while Claims 2, 4, 14 and 21 have been amended. No claims have been added. Accordingly, Claims 1-18 and 21-101 are now at issue in the present case.

I. Claim Rejections

Claims 1-18, 20-29, 38, 42, 43, 50, 55-58, 61, 63, 64 and 66-73 were rejected. Specifically, Claims 1, 6-18, 20-26, 28, 64 and 67-73 were rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 6,462,496 to Hassan et al. (hereinafter "Hassan '496"). Claims 38, 42 and 43 were rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 5,821,717 to Hassan et al. (hereinafter "Hassan '717"). Claim 2 was rejected under 35 U.S.C. 103(a) as being unpatentable over Hassan '496 in view of U.S. Patent No. 5,838,515 to Mortazavi et al. (hereinafter "Mortazavi"). Claims 4 and 5 were rejected under 35 U.S.C. 103(a) as being unpatentable over Hassan '496 in view of U.S. Patent No. 5,731,935 to Lian et al. (hereinafter "Lian"). Claims 3, 27, 29 and 66 were rejected under 35 U.S.C. 103(a) as being unpatentable over Hassan '496 in view of Hassan '717. Claims 50, 57, 58, 61 and 63 were rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 4,422,027 to Mohlere (hereinafter "Mohlere") in view of Hassan '717.

II. Allowed and allowable claims

Claims 30-37, 44-49 and 74-101 were allowed. Claims 39-41, 51-54, 59, 60, 62 and 65 were objected-to as being dependent upon a rejected base claim. The Examiner indicated that such claims would be allowable if rewritten in independent form to include all of the limitations

of their base claims and any intervening claims. Instead of writing the objected-to claims in independent form, Applicant offers arguments (presented below).

III. Rejection of Claims 1, 6-18, 20-26, 28, 64 and 67-73 under 35 U.S.C. 102(b)

Rejection of Claims 1, 6-18, 20-26, 28, 64 and 67-73 under 35 U.S.C. 102(b) as being anticipated by Hassan '496 is respectfully traversed because Hassan '406 does not disclose all of the limitations of the claims.

Regarding Claim 1, the Examiner believes Hassan '496 discloses a transconductance amplifier 410 (FIG. 4) to detect a current by comparing a coil current and a command current (col. 4, lines 11-35). It is respectfully submitted that the amplifier 410 is not "a transconductance amplifier to detect an error current by comparing said coil current and a command current," as required by Claim 1. Hassan '496 clearly states that the amplifier 410 simply converts a voltage V_{SNS} (FIG. 3) to a current:

> The current through sense resistor 330 produces a voltage across sense resistor 330 which is measured across terminals 332 and 334 designated by voltage V_{SNS} and V_{SNSN} , respectively. This is an indication of the actual motor current. Connected to terminal 332 is transconductance amplifier 410 to convert the voltage V_{SNS} to a current. The voltage V_{SNS} is input to transconductance amplifier 410. The output of transconductance circuit 410 is connected to NFET 412. The gate of NFET 412 is connected to the output of transconductance circuit 410. The current from transconductance circuit 410 turns on NFET 412. The other input to transconductance circuit 410 is connected to the source of NFET 412. Thus, the difference in voltage between V_{SNS} and V_{SNSN} is impressed on the source of NFET 412 and voltage V_{SNS} determines the amount of current output from the transconductance amplifier 410. (Hassan '496, col. 3, lines 44-62).

Unlike the claimed invention, the amplifier 410 does not compare a sensed coil current and a command current, and the output of the amplifier 410 is not a detected error current.

Rather, the amplifier 410 converts the V_{SNS} voltage to an output current wherein the voltage V_{SNS} determines the amount of current output from the amplifier 410. The amplifier 410 impresses the voltage difference between V_{SNS} and V_{SNSN} (i.e., voltage across resistor 330) on the NFET 412, wherein the current from transconductance circuit 410 turns on NFET 412. Therefore, unlike the claimed invention, output of the amplifier is not a detected error current. The amplifier 410 has nothing to do with "a transconductance amplifier to detect an error current by comparing said coil current and a command current," as required by Claim 1.

Further, in col. 4, lines 11-35 (relied upon by the Patent Office), Hassan '496 describes operation of a bias current generator 418 (FIG. 5) that generates a bias current for the DAC 416 (FIG. 4), stating:

> FIG. 5 illustrates the bias current generator to generate the bias current for the DAC. The current I_{DAC} output from the IDAC is an integer fraction or multiple of the bias current that can be controlled via the input to the DAC and is a reference current. The current I_{VMA} through the drain to source of FET 412 depends on the voltage at terminal 332 and terminal 334, namely the voltage V_{SNS} and voltage V_{SNSN}. If there is a difference between the current I_{DAC} output from the current DAC 416 and the current I_{VMA} through the FET 412, the difference I_{DAC} -I_{VMA} or the current I_{VMAG} is input to the loop filter 404. The current I_{VMAG} charges up the capacitors of the loop filter 404 illustrated as capacitors 406 and 408. Thus, the current at terminal 422 is indicative of the current entering the loop filter 440, namely I_{VMAG}. The voltage at terminal 422, namely voltage I_{MAG} is input to either a pulse width modulation circuit or a linear circuit. In any event, it can be seen how the voltages are transformed into current I_{VMAG} and input into loop filter 404. The currents I_{VMA} are compared to a reference current, namely I_{DAC}, and the resulting difference I_{VMAG} of current is transformed to a voltage. Thus, the voltage V_{SNS} is transformed from the voltage domain to the current domain and then back to the voltage domain. The output voltage V_{SNS} from the sense resistor is converted to the current I_{VMA}.

The Examiner has interpreted the amplifier 410 to detect an error current from a sense current and a command current. However, Hassan '496 does not disclose such limitations. As

the above passage (col. 4, lines 11-35) clearly describes, the bias current generator 418 generates a bias current I_{BIAS} for the DAC 416, not a command current. The current I_{DAC} output from the IDAC 416 is a reference current and the current I_{VMA} through the drain to source of FET 412 depends on the voltage at terminal 332 and terminal 334, namely the voltage V_{SNS} and voltage V_{SNSN}. Accordingly, the amplifier 410 does not detect an error current from the current I_{DAC} and the current I_{VMA}.

Further, Hassan '496 does not disclose "a compensator to integrate said error current into said coil current," as required by Claim 1. In the passages cited by the Examiner, Hassan '496 simply states that the filter 404 generates an output voltage V_{MAG} at terminal 422 from the current I_{VMAG}, wherein the voltage V_{MAG} is input to the PWM circuit (col. 5, lines 40-43). Hassan '496 further states that the voltage V_{SNS} is transformed from the voltage domain to the current domain and then back to the voltage domain. The output voltage V_{SNS} from the sense resistor is converted to the current I_{VMA} (col. 4, lines 31-35). Thus, circuit 404 generates a voltage from a current, rather than integrating an error current into the coil current as claimed. For at least these reasons, Applicant believes that Claim 1 is patentably distinguishable from Hassan '496.

Claim 64 was rejected for reasons similar to those provided in rejecting Claim 1. Applicant submits that, for at least the reasons provided above in relation to Claim 1, Claim 64 is patentably distinguishable from Hassan '496.

Claims 6, 7, 9, 11 depend from Claim 1 **and Claims 67, 68, 70, 72** depend from Claim 64. Applicant believes that such claims are patentably distinguishable from Hassan '496 at least for the reasons presented above with respect to Claims 1 or 64.

Regarding Claim 8, it is respectfully submitted that Hassan' 496 does not disclose that the driver further comprises: "a driver amplifier to supply said coil current, said driver amplifier coupled to said compensator," as required by Claim 8. In rejecting Claim 1 above, the Examiner stated that the amplifier 410 in FIG. 4 of Hassan '496 is a transconductance amplifier. Then in rejecting Claim 8, the Examiner interprets the amplifier 410 as a driver amplifier to supply a coil current. These two interpretations of the amplifier 410 are not only inaccurate, but also incongruent.

As discussed above, the amplifier is not a transconductance amplifier to detect an error current by comparing said coil current and a command current, as required by Claim 1. Indeed, the amplifier 410 is a device that converts the V_{SNS} voltage to a current output for turning the FET 412 on and off. Therefore, the amplifier 410 does not supply a coil current and, as such, is not a driver amplifier to supply said coil current, as required by Claim 8. For at least these reasons, Applicant believes that Claim 8 is patentably distinguishable from Hassan '496.

Claim 69 was rejected for reasons similar to those provided with respect to Claim 8. Applicant believes that Claim 69 is patentably distinguishable from Hassan '496 for at least the reasons provided with respect to Claim 8.

Regarding Claim 10, it is respectfully submitted that Hassan '496 does not disclose that: "said command current is received at said driver from a microcontroller," as required by Claim 10. Nowhere in Hassan '496 is there any disclosure that the controller unit 160 provides any kind of command current, or that the driver 166 in any way receives a command current from the controller 160. If the Examiner believes otherwise, Applicant respectfully requests the Examiner to point to specific passage in Hassan '496 where such limitations are disclosed. For at least the above reasons, Applicant believes that Claim 10 is patentably distinguishable from Hassan '496.

Claim 71 was rejected for reasons similar to those provided in rejecting Claim 10. Applicant believes that Claim 71 is patentably distinguishable from Hassan '496 for at least the reasons provided above in relation to Claim 10.

Regarding Claim 12, Applicant submits that Hassan '496 does not disclose that: "said transconductance amplifier includes a first input and a second input, such that said coil current is coupled to the first input of the transconductance amplifier, and said command current is coupled to the second input of the transconductance amplifier, wherein the transconductance amplifier detects said error current by determining the difference between the coil current and the command current," as required by Claim 12. As discussed in relation to Claim 1 above, the amplifier 410 does not compare a sensed coil current and a command current, and the output of the amplifier 410 is not detecting an error current. Rather, the amplifier 410 converts the V_{SNS} voltage to an output current wherein the voltage V_{SNS} determines the amount of current output from the amplifier 410.

Not only is the amplifier 410 not a transconductance amplifier, but the inputs to the amplifier 410 are not a sense current and a commend current as required by Claim 12. In col. 3, lines 50-62, Hassan '496 clearly states that:

> Connected to terminal 332 is transconductance amplifier 410 to convert the voltage V_{SNS} to a current. The voltage V_{SNS} is input to transconductance amplifier 410. The output of transconductance circuit 410 is connected to NFET 412. The gate of NFET 412 is connected to the output of transconductance circuit 410. The current from transconductance circuit 410 turns on NFET 412. The other input to transconductance circuit 410 is connected to the source of NFET 412. Thus, the difference in voltage between V_{SNS} and V_{SNSN} is impressed on the source of NFET 412 and voltage V_{SNS} determines the amount of current output from the transconductance amplifier 410.

For at least the above reasons, Applicant submits that Claim 12 is patentably distinguishable from Hassan '496.

Regarding Claim 13, it is respectfully submitted that Hassan '496 does not disclose that: "said compensator is coupled to a gain buffer," as required by Claim 13. No gain buffer is disclosed in Hassan '496.

In rejecting Claim 1 above, the Examiner stated that the amplifier 410 in FIG. 4 of Hassan '496 is a transconductance amplifier. Then, in rejecting Claim 13, the Examiner interprets the amplifier 410 as a gain buffer. These two interpretations of the amplifier 410 are not only inaccurate, but also incongruent. The amplifier 410 is not a transconductance amplifier and the amplifier 410 is not a gain buffer. As discussed above, the amplifier simply converts a voltage V_{SNS} (FIG. 3) to a current. Nowhere in Hassan '496 is it disclosed that the amplifier 410 is a gain buffer as claimed. If the Examiner believes otherwise, the Examiner is requested to identify such disclosure and provide an explanation of same. For at least these reasons, Applicant believes that Claim 13 is patentably distinguishable from Hassan '496.

Claim 73 was rejected for reasons similar to those provided with respect to Claim 13. Therefore, Applicant believes that Claim 73 is patentably distinguishable from Hassan '496 at least for reasons similar to those provided with respect to Claim 73.

Regarding Claim 14, for at least the reasons provided above in relation to Claim 1, it is respectfully submitted that Hassan '496 does not disclose: "determining an error current by comparing said coil current and a command current using a transconductance amplifier; and integrating said error current into said coil current," as required by Claim 14. Accordingly, Applicant believes that Claim 14 and all claims that depend therefrom are patentably distinguishable from Hassan '496.

Regarding Claim 23, it is respectfully submitted that Hassan '496 does not disclose: "A current control device for a voice coil motor driver, said voice coil motor driver coupled to a microprocessor to receive commands specifying a command current for a voice coil motor", as required by Claim 23. Nowhere does Hassan '496 disclose that the controller unit 160 provides any kind of command current, or that the driver 166 in any way receives a command current from the controller 160. If the Examiner believes otherwise, the Examiner is respectfully requested to point to specific language in Hassan '496 where such limitations are disclosed.

Further, Hassan '496 does not disclose that the current control device comprises: "an amplifier to drive said voice coil motor with a coil current; and a compensator circuit to integrate an error current with said command current to generate said coil current, wherein said error current is detected by comparing the command current and said coil current sensed with a sensor coupled between said amplifier and said voice coil motor," as required by Claim 23. The amplifier 410 in Hassan '496 is not an amplifier to drive the voice coil motor with a coil current, as claimed. The amplifier 410 only converts the V_{SNS} voltage to an output current wherein the voltage V_{SNS} determines the amount of current output from the amplifier 410 to turn the FET 412 on/off. For at least these reasons, Applicant believes that Claim 23 is patentably distinguishable from Hassan '496.

Regarding Claim 24, it is respectfully submitted that Hassan '496 does not disclose that the current control device further comprises: "a transconductance amplifier to detect and calculate said error current by comparing the command current and said coil current," as required by Claim 24. As discussed above, the amplifier 410 does not compare a sensed coil current and a command current, and the output of the amplifier 410 is not detecting an error current. Rather, the amplifier 410 converts the V_{SNS} voltage to an output current wherein the voltage V_{SNS}

determines the amount of current output from the amplifier 410. Therefore, Applicant believes that, for at least these reasons, Claim 24 is patentably distinguishable from Hassan '496.

Claims 25 and 26 depend from Claim 23 and are believed to be patentably distinguishable from Hassan '496 for at least the reasons provided with respect to Claim 23.

Regarding Claim 28, it is respectfully submitted that Hassan '496 does not disclose that: "said amplifier is coupled to a set of transistors to provide said coil current," as required by Claim 28. As noted above, the amplifier 410 is not an amplifier to drive the voice coil motor with a coil current. Further, Hassan '496 does not show that the amplifier 410 is connected to a set of transistors to provide said coil current. For at least these reasons, Applicant believes that Claim 28 is patentably distinguishable from Hassan '496.

IV. Rejection of Claims 38, 42 and 43 under 35 U.S.C. 102(b)

Rejection of Claims 38, 42 and 43 under 35 U.S.C. 102(b) as being anticipated by Hassan '717 is respectfully traversed because Hassan '717 does not disclose all of the limitations of the claims.

Regarding Claim 38, it is respectfully submitted that Hassan '717 does not disclose a method for controlling a voice coil motor accessing a track on a magnetic disk with a driver, by steps including: "supplying a coil current to said voice coil motor; amplifying said coil current; and shaping a command current waveform according to said coil current," as required by Claim 38. In col. 3, lines 10-15 (relied upon by the Patent Office), Hassan '717 states:

> Actuator control block 110 includes low pass filter 111, error amplifier 112, actuator motor predrive amplifier 113, and sense amplifier 114. A current control device 10, which may be, for example, a part of digital signal processing block 70, supplies an input voltage representative of the desired actuator current.

In the above passage, Hassan '717 does not disclose: "supplying a coil current to said voice coil motor," as required by Claim 38. Rather, Hassan '717 states that a device 10 supplies an input voltage representative of the desired actuator current. This has nothing to do with supplying a coil current, as claimed.

Further, in col. 3, lines 15-19 (relied upon by the Patent Office), Hassan '717 states:

> This voltage is filtered by low pass filter 111. Sense amplifier 114 produces an output signal proportional to the actual current passing through actuator 300 by sensing and amplifying the voltage drop across sense resistor 310.

In the above passage, Hassan '717 does not disclose: "amplifying said coil current," as required by Claim 38. Rather, Hassan '717 states that the amplifier 114 amplifies the voltage drop across the resistor 310. This has nothing to do with amplifying the coil current, as claimed.

Further, in col. 3, lines 20-37 (relied upon by the Patent Office), Hassan '717 does not disclose: "shaping a command current waveform according to said coil current," as required by Claim 38. Rather, in that passage, Hassan '717 only states that the error amplifier 112 takes the difference between the output of sense amplifier 114 and the output of low pass filter 111. This difference voltage is then compared to the reference voltage from reference source 115, and the difference between the two voltages is amplified to produce a target voltage. The target voltage is proportional to the difference between the desired and actual actuator currents, with a voltage offset. The target voltage is the desired voltage across actuator motor nodes 301 and 302 (col. 3, lines 20-37). Accordingly, there is no shaping of a command current waveform according to the coil current. For at least these reasons, Applicant believes that Claim 38, and all claims that depend therefrom, are patentably distinguishable from Hassan '717.

Regarding Claim 42, it is respectfully submitted that Hassan '717 does not disclose supplying the coil current to a center tap coupling said voice coil motor to said driver, as required

by Claim 42. In col. 3, lines 39-67 of Hassan '717, there is no mention of such limitations. Accordingly, Applicant submits that Claim 42 is patentably distinguishable from Hassan '717.

Regarding Claim 43, it is respectfully submitted that Hassan '717 does not disclose amplifying said coil current with a current sense amplifier, as required by Claim 43. As discussed, in col. 3, lines 10-19 (relied upon by the Patent Office), Hassan '717 only mentions that a device 10 supplies an input voltage representative of the desired actuator current and that the amplifier 114 amplifies the voltage drop across the resistor 310. This has nothing to do with amplifying the coil current with a current sense amplifier, as claimed. Accordingly, Applicant believes that Claim 43 is patentably distinguishable from Hassan '717.

V. Rejection of Claims 2-5, 27, 29, 50, 57, 58, 61, 63 and 66 under 35 U.S.C. § 103(a)

Claim 2 was rejected under 35 U.S.C. 103(a) as being unpatentable over Hassan '496 in view of Mortazavi. It is respectfully submitted that the references alone or in combination do not disclose "a force couple created by said current in said voice coil motor," as required by Claim 2.

As discussed, Hassan does not teach all of the limitations of Claim 1. Further, despite the Examiner's contention, Mortazavi does not even mention the phrase "force couple." In col. 10, lines 20-25, Mortazavi simply states:

> A resultant current flows through the coil 24, either in the forward or reverse direction, causing a reaction force to be applied to the head positioner 18 during seek deceleration in order to stop the head relative to the disk at a desired track location in the shortest practical time with minimum heat being generated within the motor chip 26.

However, this has nothing to do with a force couple created by a current in a voice coil motor, as claimed. Generally, a force couple is defined by two parallel forces of equal magnitude, but opposite direction, applied to a structure at equal distances from the center of the

mass. Mortazavi does not describe, show or even mention such a function. Claim 2 has further been amended to clarify that the force couple is created by oppositely polarizing two coils in the voice coil motor. For at least the above reasons, Applicant believes that Claim 2 is patentably distinguishable from both Hassan '496 and Mortazavi both alone and in combination.

Rejection of Claims 4 and 5 under 35 U.S.C. 103(a) as being unpatentable over Hassan '496 in view of Lian is respectfully traversed because the references, alone or combination, do not disclose all of the claimed limitations. As discussed, Hassan '496 does not teach all of the limitations of Claim 1.

Regarding Claim 4, Lian is directed to a motor coil for positioning a magnetic head for a tape drive which is different than a voice coil motor for positioning in a disk drive. Further, Lian (FIG. 5 and col. 4, lines 41-45) shows and describes a system that can use two motor coils 40 and not a voice coil motor including two motor coils as claimed. Further, the motor coils of Lian are not activated to retract a head positioner as claimed. The Examiner has also failed to explain how a motor coil for a tape drive (non-analogous art) can be used in a disk drive such as in Hassan '496 to achieve the claimed invention. For at least these reasons, Applicant believes that Claim 4 is patentably distinguishable from Hassan '496 and Lian both alone and in combination.

Regarding Claim 5, rejection of Claim 5 is respectfully traversed for at least the reasons provided above in relation to Claim 4. Further, there is no mention in Lian that: "said first coil motor and said second coil motor are coupled in series such that said coil current flows through both coil motors," as required by Claim 5. If the Examiner believes otherwise, the Examiner is requested to identify and explain such disclosure in Lian. In addition, Lian's motor coil is specific to a tape dive which is different from a disk drive. In view of the above, Applicant

submits that Claim 5 is patentably distinguishable from Hassan '496 and Lian both alone and in combination.

Rejection of Claims 3, 27, 29 and 66 under 35 U.S.C. 103(a) as being unpatentable over Hassan '496 in view of Hassan '717 is respectfully traversed because the references, alone or combination, do not disclose all of the claimed limitations.

Regarding Claim 3, as discussed Hassan '496 does not teach all of the claimed limitations. Further, as admitted by the Examiner, Hassan '496 does not disclose "a current sense amplifier coupled to said transconductance amplifier to amplify a voltage across said sensor," as required by Claim 3. Even further, Applicant believes that Hassan '717 does not disclose such limitation.

The sense amplifier 114 in Hassan '717 is not coupled to the transconductance amplifier 128 and they do not function as claimed. Indeed, the sense amplifier 114 is a component of the actuator control block 110 for controlling the voice coil motor (col. 3, lines 10-20), and the transconductance amplifier 128 is a component of the spindle control block 120 for controlling the spindle motor (col. 4, lines 1-9). One has nothing to do with the other. As such, the sensor amplifier 114 and the transconductance amplifier 128 do not disclose: "a current sense amplifier coupled to said transconductance amplifier to amplify a voltage across said sensor," as required by Claim 3. Therefore, even if Hassan '496 and Hassan '717 were combined (Applicant submits that they cannot), such a combination is non-functioning and does not disclose all of the claimed limitations of Claim 3. Accordingly, Applicant believes that Claim 3 is patentably distinguishable from Hassan '496 and Hassan '717 (both alone and in combination).

Claim 66 was rejected for similar reasons as Claim 3. Applicant submits that Claim 66 is patentably distinguishable from Hassan '496 and Hassan '717 (both alone and in combination) for at least the reasons provided above in relation to Claim 3.

Regarding Claim 27, as discussed above Hassan '496 does not teach all of the limitations of Claim 23. Further, as the Examiner admits, Hassan '496 does not disclose: "a current sense amplifier coupled between said sensor and said compensator to amplify a voltage across said sensor," as required by Claim 27.

The Examiner contends that Hassan '717 teaches a sense amplifier 114 coupled between a sense resistor 310 and an error amplifier 112, and that it would have been obvious to modify Hassan '496 to couple a current sense amplifier to "a transconductance amplifier as taught by Hassan '717" (Office Action, page 7, 4th paragraph). However, as noted above, Hassan '717 does not disclose coupling a sense amplifier to a transconductance amplifier. Further, coupling the sense amplifier 114 between the sensor 310 and the error amplifier 112 in Hassan '717 has nothing to do with coupling a current sense amplifier between a sensor and a compensator to amplify a voltage across the sensor. There is no teaching or motivation in either Hassan '496 or Hassan '717 to combine them, and the Examiner has not explained how such a combination can be achieved to result in a working system that discloses the claimed limitations. For at least these reasons, Applicant believes that Claim 27 is patentably distinguishable from Hassan '496 and Hassan '717 both alone and in combination.

Regarding Claim 29, it is respectfully submitted that despite the Examiner's contention, Hassan '496 does not disclose: "an amplifier to drive said voice coil motor with a coil current, said coil current flows from one terminal of said voice coil motor to another terminal, wherein both terminals are coupled to said driver," as required by Claim 29. This is because element 404

in Hassan '496 is a loop filter which in no way is an amplifier that drives a voice coil motor (col. 4, lines 18-27; col. 5, lines 40-44). The loop filter 404 provides a voltage that is coupled to a PWM or a linear circuit, rather than providing a coil current that flows from one terminal to another terminal of the coil coupled to the driver.

Further, Hassan '496 does not disclose "a sensor to sense said coil current in said voice coil motor, wherein said sensor is coupled between said amplifier and said voice coil motor," as required by Claim 29. As noted above, the Examiner has erroneously interprets the loop filter 404 as an amplifier, and then improperly interprets the loop filter 404 and the amplifier 410 interchangeably as the amplifier to drive said voice coil motor with a coil current. Further, the Examiner improperly switches back and forth between the loop filter 404 and the amplifier 410 as the same element in rejecting the claim.

Additionally, Hassan '496 does not disclose "a transconductance amplifier coupled to said current sense amplifier to receive said voltage and a command current, wherein said transconductance amplifier calculates an error current by comparing the sense current with the command current," as required by Claim 29. As discussed in relation to Claim 1, in Hassan '496, the amplifier 410 is not a transconductance amplifier that receives a sense voltage and command current to calculate an error current. Further, the Examiner again improperly interprets the amplifier 410 to be both the amplifier that provides a coil current and the transconductance amplifier that calculates an error current.

Further, Hassan '496 does not disclose "an integrator coupled to said transconductance amplifier to integrate said error current into said command current to determine said coil current," as required by Claim 29. As discussed in relation to Claim 1, the loop filter 404 is not an integrator.

As the Examiner also admits, Hassan '496 does not disclose a current sense amplifier coupled to the transconductance amplifier to amplify a voltage across said sensor, wherein said voltage correlates to said coil current. However, the Examiner contends that Hassan '717 discloses a current sense amplifier 114 to amplify a voltage across the sensor 310, and a transconductance amplifier 128 coupled to the current sense amplifier 114. However, as discussed in relation to Claim 3, the sense amplifier 114 in Hassan '717 is not coupled to the transconductance amplifier 128. Indeed, the sense amplifier 114 is a component of the actuator control block 110 for controlling the voice coil motor (col. 3, lines 10-20), and the transconductance amplifier 128 is a component of the spindle control block 120 for controlling the spindle motor (col. 4, lines 1-9). One has nothing to do with the other. Therefore, even if Hassan '496 and Hassan '717 were combined (Applicant believes they cannot), such a combination is non-functioning and does not disclose all of the claimed limitations. Accordingly, for at least the above reasons, Applicant believes that Claim 29 is patentably distinguishable from Hassan '496 and Hassan '717 both alone and in combination.

Rejection of Claims 50, 57, 58, 61 and 63 under 35 U.S.C. 103(a) as being unpatentable over Mohlere in view of Hassan '717 is respectfully traversed because the references, alone or in combination, do not disclose all of the claimed limitations.

Regarding Claim 50, Mohlere does not disclose a driver for controlling a voice coil motor having a first coil motor and second coil motor, as required by Claim 50. It is respectfully submitted that in Fig. 2 of Mohlere, items Unit 1 and Unit 2 are two different, independent, voice coil motors. Indeed, Mohlere states that:

> The controller can handle two motors as is shown in FIG. 2. Each of the two shown control computer (CPU) channels 101 and 100 controls 1 channel ... The Motor(s) get driven by the AMDRIVE signal hh. The Graticule Position Sensor 201 of unit 1 attached to

> the motor 202 sends back indicating signals ee, ff and gg from which the controller 203 computes position, direction, and velocity information. Unit 2 acts in the same manner as unit 1. (col. 2, lines 34-44).

Mohlere only discloses two different, independent, voice coil motors that can be controlled, one at a time, by a controller.

Further, Hassan '717 does not disclose "an error amplifier to calculate a differential between said velocity voltage and a command voltage," as required by Claim 50. In col. 3, lines 20-37 (relied upon by the Examiner), Hassan '717 does not disclose such an error amplifier. Indeed, Hassan '717 states that:

> A current control device 10, which may be, for example, a part of digital signal processing block 70, supplies an input voltage representative of the desired actuator current. This voltage is filtered by low pass filter 111. Sense amplifier 114 produces an output signal proportional to the actual current passing through actuator 300 by sensing and amplifying the voltage drop across sense resistor 310. (col. 3, lines 12-19).

Then, Hassan '717 states that the "error amplifier 112 takes the difference between the output of sense amplifier 114 and the output of low pass filter 111" (col. 3, lines 23-25). Therefore, there is no velocity voltage sensing in Hassan '717 and there is no use for it by modifying Hassan '717.

Further, Hassan '717 does not disclose "a retract amplifier to compensate said command voltage with said differential," as required by Claim 50. In rejecting Claim 50, the Examiner relies on Item 113 in Fig. 2 of Hassan '717. However, there is no teaching in Hassan '717 that Item 113 compensates a command voltage with a differential between the velocity voltage and the command voltage.

The Examiner further relies on Hassan '717, col. 5, lines 37-67. However, there is no description therein of a retract amplifier as required by Claim 50. By contrast, in that passage, Hassan '717 states that:

> ... When the supply voltage drops below a threshold level, voltage monitor 133 sends a fault signal to actuator retract block 131.... When actuator retract block 131 receives a fault signal from voltage monitor 133 on input port 131a indicating a loss of supply voltage, an output signal is sent to actuator motor predrive amplifier 113 causing fast retraction of the read head. When a head retract is requested for some non-critical reason, a slower retraction is desirable so as to avoid potential damage to the read heads caused by sudden acceleration. Thus, when a retract signal is received on input port 131b, actuator retract block 131 sends an output signal to actuator motor predrive amplifier 113 causing slow retraction of the read head.

As such, Hassan '717 cannot use velocity for VCM coil current control. Hassan's error amplifier 113 does not and cannot use a velocity voltage. Further, the VCM retract amplifier 131 in Hassan '717 is not a retract amplifier, as required by Claim 50.

Even further, there is no suggestion or motivation in either Mohlere or Hassan '717 to combine them. Even if Mohlere is combined with Hassan '717, the resulting combination does not disclose the claimed invention. This is because such a combination, if operational, may provide control for two different VCMs, and does not compensate a command voltage by a differential between a sensed velocity voltage and a command voltage, as required by Claim 50. Therefore, for at least the above reasons, Applicant submits that Claim 50, and the claims that depend therefrom, are patentably distinguishable from Mohlere and Hassan '717 both alone and in combination.

Claim 58 was rejected for reasons similar to those provided with respect to Claim 50. Accordingly, Applicant submits that Claim 58 is patentably distinguishable from Mohlere and

Hassan '717 (both alone and in combination) for reasons similar to those provided with respect to Claim 50.

Regarding Claim 61, with reference to the reasons provided above in relation to Claim 50, there is no teaching in Hassan '717 of coupling a retract amplifier to the VCM, wherein the retract amplifier is for compensating the voltage command with the differential voltage between the velocity voltage and the command voltage. Further, the retract block 131 in Fig. 2 of Hassan (relied on by the Examiner) is not even an amplifier, as shown above. Therefore, Applicant believes that Claim 61 is patentably distinguishable from Mohlere and Hassan '717 (both alone and in combination).

Regarding Claims 57 and 63, there is no teaching in Hassan '717, col. 5, lines 37-67, that a retract amplifier, functioning as claimed in Claims 50 and 61 (respectively), is turned on and off as required by Claims 57 and 63. Accordingly, for at least this reason, Applicant believes that Claims 57 and 63 are patentably distinguishable from Mohlere and Hassan '717 both alone and in combination.

Claims 55 and 56 are believed to be patentably distinguishable from Mohlere and Hassan '717 at least because they depend from Claim 50.

VI. Additional Claim Fees

In determining whether additional claim fees are due, reference is made to the Fee Calculation Table (below).

Fee Calculation Table

	Claims Remaining After Amendment		Highest Number Previously Paid For	Present Extra	Rate	Additional Fee
Total (37 CFR 1.16(c))	99	Minus	100	= 0	x $18 =	$ 0.00
Independent (37 CFR 1.16(b))	16	Minus	16	= 0	x $86 =	$ 0.00

As set forth in the Fee Calculation Table (above), Applicant previously paid claim fees for one hundred (100) total claims and for sixteen (16) independent claims. Accordingly, Applicant believes that no additional fees are due. Nevertheless, Applicant hereby authorizes the Commissioner to charge Deposit Account No. 50-2198 for any fee deficiencies associated with filing this paper.

VII. Conclusion

Applicant believes that the application appears to be in form for allowance. Accordingly, reconsideration and allowance thereof is respectfully requested.

The Examiner is invited to contact the undersigned at the below-listed telephone number regarding any matters relating to the present application.

Respectfully submitted,

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